

Name: TEACHER COPY

**Final/Keystone Exam Review Packet  
Academic Biology**

To assess your understanding of Biology you will take the Central Bucks Final Exam as well as the Biology Keystone Exam given by the State of Pennsylvania.

The final exam consists of 50 multiple choice questions and will be given at the end of the course. The score makes up 10% of your course grade. The questions are grouped into categories: Biochemistry, Cell Physiology, Cell Energy, Genetics, Embryology, and Microbiology. It will be given in your regular Biology class during final exam days

The Keystone exam will be given over two days during a special class schedule. The Keystone Exam does not include Embryology or Microbiology, but will include Ecology and Evolution. The Keystone is a state requirement for graduation.

	Section	Topic	Chap./Pages	Points Possible	Points Earned
1/3	1 WEDNESDAY	Biochemistry	Ch. 2, pp 34 - 53	10 PTS	
1/4	2 THURSDAY	Cell Physiology	Ch. 7, pp 190 - 215	10 PTS	
1/5	3 FRIDAY	Cellular Energy	Ch. 8 & 9, pp 226 - 241; pp 250 - 265	10 PTS	
1/8	4 MONDAY	Genetics	Ch. 12, 13, 10, 14	10 PTS	
1/9	5 TUESDAY	Ecology		10 PTS	
1/10	6 WEDNESDAY	Evolution		10 PTS	
	7	Microbiology			
	8	Embryology			

**TOTAL 60 PTS**

→ 30 PTS FOR COMPLETING SECTIONS

→ 30 PTS FOR PRACTICE QUESTIONS



## Molecules of Life (Biochemistry)

- What are the 4 most common elements found in living things? C, H, O, N
- What element of those in # 1 is the basis for organic chemistry? carbon
- Define the following:
  - Covalent Bond- atoms share electrons
  - Ionic Bond- e<sup>-</sup> transferred from one atom to another
- Complete the table that lists the common organic compounds of life.

	Carbohydrates	Lipids	Proteins	Nucleic Acids
Monomers	Simple sugars monosaccharides glucose	glycerol fatty acids	amino acids	nucleotides
Polymers	polysaccharides glycogen, starch		polypeptides	DNA RNA
Major Function(s) of the body	Source of E	Store E	aid in reactions regulate cell processes	Store & transmit genetic info

CHO 1:2:1      CH      CHON      CHONP

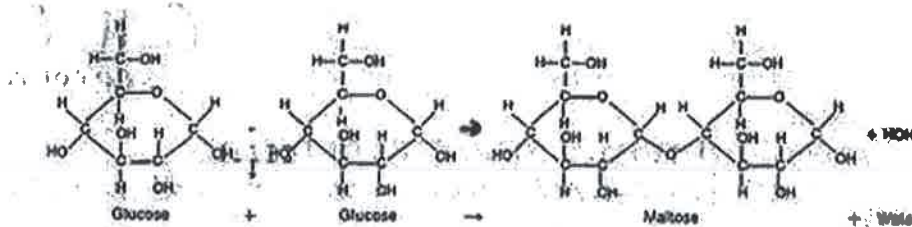
- Complete the following table for each molecule listed below.

Molecules	Type of Organic Compound (carb, lipid, protein, nucleic acid)	Is it a Monomer or a Polymer?	Major Function
Cellulose	carb	polymer	plant strength & rigidity
Polypeptide	protein	polymer	enzymes hormones
Polysaccharide	carb	polymer	store E
Glycerol and Fatty Acids	lipid	monomer	store E
Starch	carb	polymer	store E
Phospholipids	lipid	polymer	cell membrane
Glucose	carb	monomer	E
Simple Sugar	carb	monomer	E

break with  
H<sub>2</sub>O

create  
by  
removing H<sub>2</sub>O

6. In the pictures below, identify each reaction as hydrolysis and dehydration synthesis.

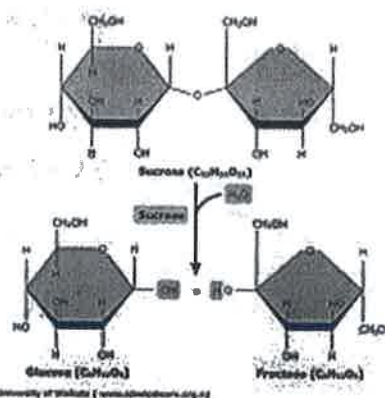


a. Is the above picture an example of HYDROLYSIS or DEHYDRATION SYNTHESIS (circle one)?

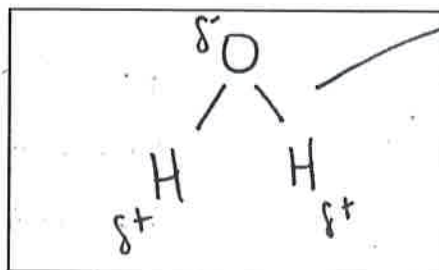
1. Is the picture making a bond or breaking a bond?
2. Does the molecule store energy or release energy?

b. Is the picture to the right an example of HYDROLYSIS or DEHYDRATION SYNTHESIS (circle one)?

1. Is the picture making a bond or breaking a bond?
2. Does the molecule store energy or release energy?

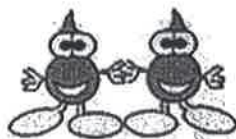
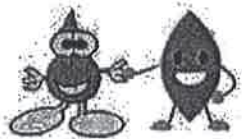


7. Draw water. Label the elements and charges that make up water.



Covalent  
bonds

8. Circle the correct term for each picture below.



Cohesion Adhesion

Cohesion Adhesion

Define Cohesion: attraction btwn molecules of same substance

Define Hydrogen Bond: attraction btwn  $H^+$  and a negative atom

Define Polar: charge is unevenly distributed

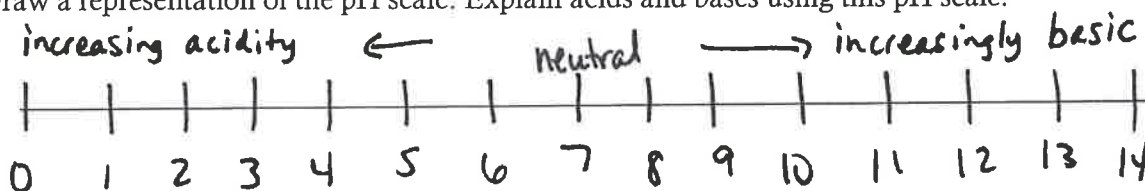
Define Non-Polar: no charge

9. Explain hydrophobic. water-hating nonpolar

Explain hydrophilic. water-loving polar

How are these related to polarity?

10. Draw a representation of the pH scale. Explain acids and bases using this pH scale.



11. To which molecule of life group do enzymes belong? proteins

What is the function of enzymes? speed up chem rxn, lower activation E

Most commonly enzymes end in what 3 letters? ase

protein  
that acts  
as catalyst

12. Explain the lock and key model of enzyme structure/function. Draw a representation and label substrate, enzyme, and active site.

Enzymes provide a site (the active site) for reactants to come together to react. These reactants are called substrates. The active site & substrates have complementary shapes, fit together like a lock & key.

13. Define a catalyst- substance that speeds up a rxn

14. What environmental factors commonly influence enzyme activity? temp and pH

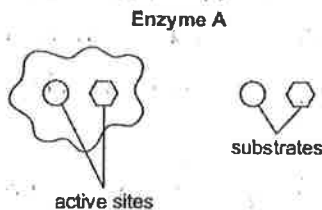
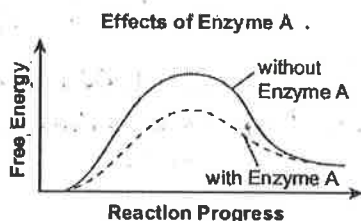
15. How do changes in the environmental factors listed above impact the activity of the enzyme?

extreme temp or pH will break down the enzyme,  
will not fn properly

### Molecules of Life Practice Questions:

16. Carbon can combine with many different elements but frequently combines with oxygen, hydrogen, and nitrogen to form organic molecules. Which statement best explains why carbon is able to form a large number of different molecules?
- Carbon forms only ionic bonds.
  - Carbon can form only ring structures.
  - ☒ Carbon can form four covalent bonds.
  - Carbon forms small, simple structures.
17. Which statement correctly describes how a protein is formed?
- A monosaccharide bonded to a side chain is broken apart.
  - ☒ Amino acids are bonded together in a long chain to form a new molecule.
  - A molecule containing glycerol bonded to three fatty acids is broken apart.
  - A nitrogenous base, a sugar, and a phosphate group combine to form a new molecule.
18. Which action must occur for an enzyme to catalyze a chemical reaction?
- A competitive inhibitor must first bind to an active site.
  - ☒ A substrate must bind to an active site of the enzyme.
  - A substrate must bind to an allosteric site of the enzyme.
  - A non-competitive inhibitor must first bind to an active site.
19. Lipase is an enzyme that breaks down lipids in the digestive system of humans. It functions best at a pH range of 4.0 to 5.0. When a person takes an antacid tablet to relieve heartburn, the antacid increases the pH to around 7 in certain areas of the digestive system. Which initial effect would most likely be caused by a change in pH?
- More lipids would be digested.
  - ☒ Fewer lipids would be digested.
  - The production of lipase molecules would increase.
  - The production of lipase molecules would decrease.

Use the graph and diagram below to answer the question.



Part A: Explain how Enzyme A acts as a catalyst in the reaction.

lowers activation Energy

Part B: Conditions around an enzyme change and affect the shape of the enzyme's active sites. Predict how this would affect the enzyme's ability to catalyze the reaction.

if sites are different, the enzyme & substrate will not fit. Enzyme cannot do its job

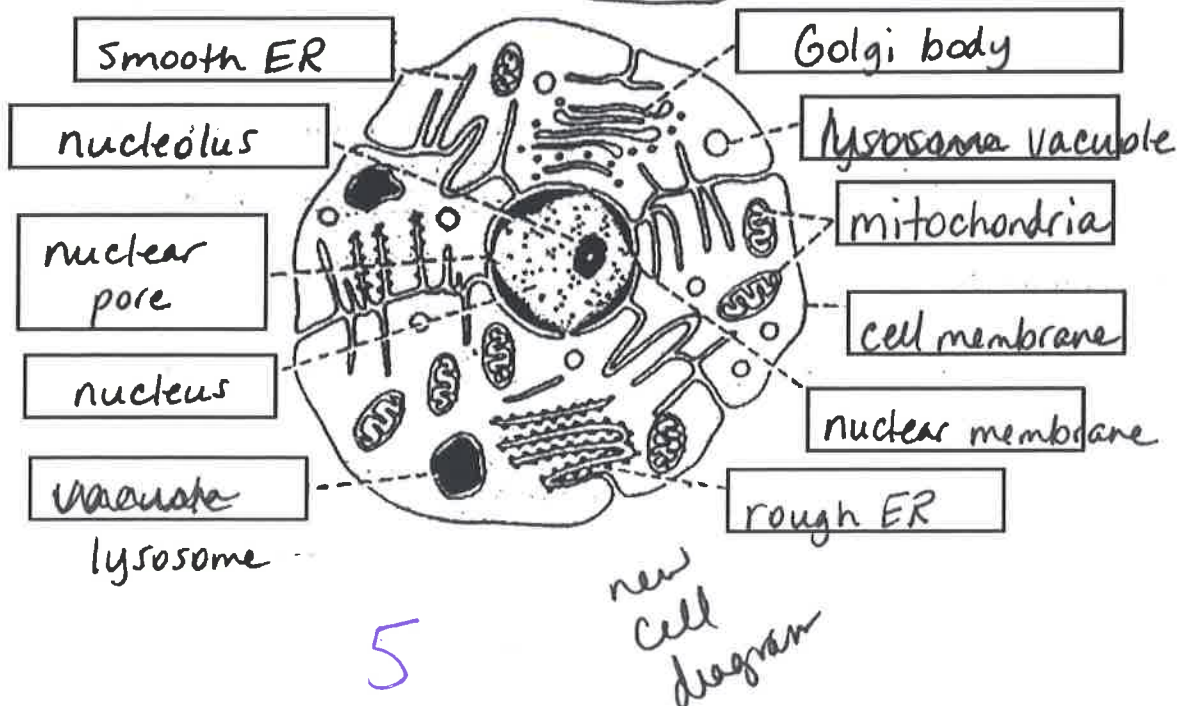


## Cell Physiology

- List the 3 components of cell theory.
  - all living things are made up of cells
  - Cells are the basic units of structure & fun in living things
  - New cells are produced from existing cells
- Differentiate between prokaryotic and eukaryotic cells. Give an example of each.
  - Prokaryote: primitive, no nucleus  
Example: bacteria
  - Eukaryote: nucleus, membrane-bound organelles  
Example: plant cell
- What is the function of each of the following organelles?

Organelle	Function	Plant, Animal or Both
Nucleus	Contains DNA controls cell activities	both
Plasma Membrane	barrier surrounding cell	both
Ribosomes	produce proteins	both
Mitochondria	powerhouse - make ATP	both
Chloroplasts	Capture E from Sunlight	plant
Lysosomes	bags of enzymes, break down & remove "junk"	both
Golgi Body	modifies, sorts, & packages proteins for storage or release	both
Vacuoles	store materials, like H <sub>2</sub> O, salts, proteins	both, mainly plants
Cell Wall	Support, shape, & protect cell	plants, prokaryotes

- Label the diagram. This is a diagram of a plant or animal cell (circle one).



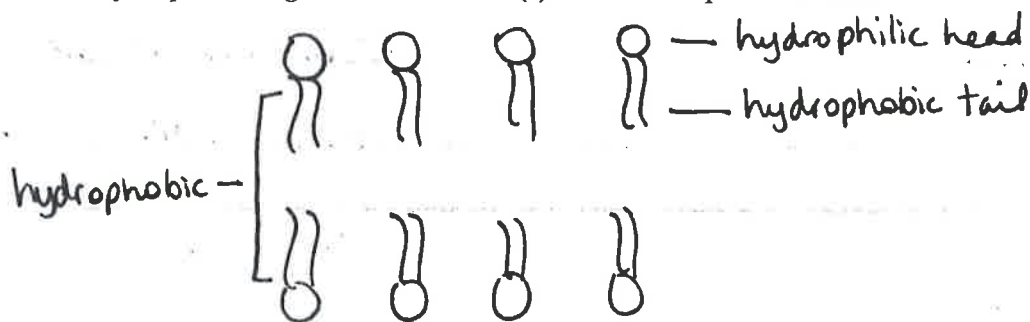
5. What organelles listed in #3 are found in most prokaryotic cells?  
cell membrane, cell wall, ribosomes
6. What organelles are present in a plant cell that are absent in an animal cell?  
cell wall, chloroplast
7. What are the levels of organization from simplest to most complex?  
atoms, molecules, cells, tissues, organs, organ system, organism
8. Compare Passive and Active Transport

	Passive Transport	Active Transport
Is energy required?	no	yes
What is the goal of this process?	hi $\rightarrow$ lo	lo $\rightarrow$ hi
Does it move with or against the concentration gradient?	with	against

9. Complete the following chart comparing the types of transport.

Type of Transport	Define	Passive or Active?
Diffusion	particles move from area of high conc to area of low conc	passive
Osmosis	diffusion of $H_2O$	passive
Facilitated Diffusion	molecules pass through membrane protein channels	passive
Endocytosis	taking material into cell	active
Exocytosis	forcing contents out of cell	active
Molecular Transport	molecules & ions carried by protein pumps	active

10. Draw a phospholipid bilayer (include 8 phospholipids total) and label the hydrophilic and hydrophobic regions. Which area(s) would be exposed to water?





11. Looking at the blood cells below determine what kind of a solution the cell is in a hypertonic, hypotonic or isotonic solution.



hypertonic

isotonic

hypotonic

- a. What type of passive transport is occurring in these examples? Osmosis  
 b. What is moving in and out of the cell in each of these 3 scenarios? H<sub>2</sub>O

12. Define homeostasis: relatively constant internal physical & chemical conditions

Cell Physiology Practice Questions:

Organism One:	Organism Two:
<ul style="list-style-type: none"> <li>• cell wall</li> <li>• endoplasmic reticulum</li> <li>• Golgi body</li> <li>• chloroplasts</li> </ul>	<ul style="list-style-type: none"> <li>• mitochondria</li> <li>• nucleus</li> <li>• ribosomes</li> <li>• vacuole</li> </ul>

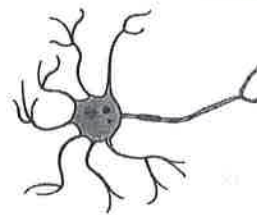
13. A student made lists of structures observed in cells from two different organisms. Which statement describes the most likely difference in the way that organism 1 and organism 2 obtain energy?

- a. Only organism 1 uses solar energy to make energy-rich compounds.  
 b. Only organism 1 stores solar energy until it is needed for its life processes.  
 c. Only organism 2 produces molecules for long-term energy storage.  
 d. Only organism 2 transforms food energy into ATP during cellular respiration.

14. Life functions are performed at many levels of biological organization. Which level of biological organization is the simplest level at which a structure can support life functions?

- a. cell  
 b. tissue  
 c. organelle  
 d. organ system

Body Cells



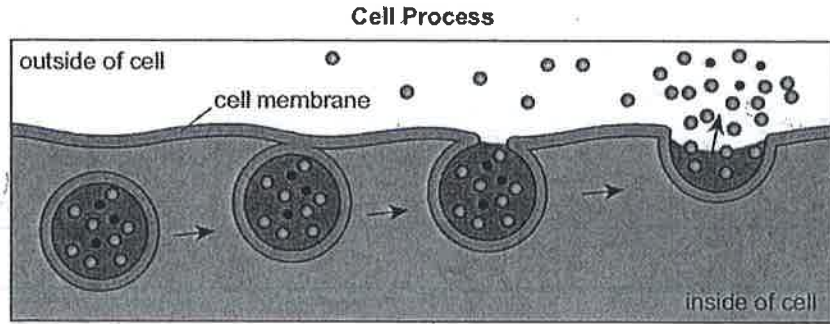
nerve cell



red blood cell

15. Which statement best explains why these cells have structural differences?

- a. The cells have different functions.  
 b. The cells evolved in different organisms.  
 c. One of the cells develops into the other type of cell.  
 d. One of the cells is more primitive than the other cell.



16. Which cell process is best modeled by the diagram?

- a. osmosis
- ☒ b. exocytosis
- c. passive transport
- d. facilitated diffusion

17. Prokaryotes are typically smaller than Eukaryote cells

Part A: Identify a structural difference between prokaryotic cells and eukaryotic cells that is directly related to their size difference. Eukaryotes contain many organelles

Part B: Based on structural difference, explain why prokaryotic cells can be much smaller than eukaryotic cells.

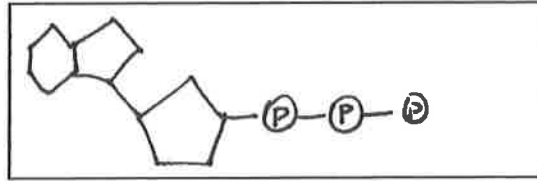
no nucleus, only DNA & ribosomes

Part C: Describe one similarity between prokaryotic cells and eukaryotic cells that is independent of size.

both contain genetic material

## Cell Energy (Photosynthesis and Respiration)

1. What types of organisms use photosynthesis? plants
2. Draw the structure of ATP and ADP and label the parts.



- a. What is the difference in structure between these two molecules? ATP - 3 phosphates ADP - 2 phosphates
  - b. Which one is higher in energy? ATP
3. What is a chlorophyll? pigment that captures sunlight
    - a. What types of organisms contain chlorophyll? plants
  4. Write the chemical equation for photosynthesis. Label products and reactants.



reactants

products

5. Write the chemical equation for cellular respiration. Label products and reactants.



reactants

products

6. What is the relationship between photosynthesis and respiration?

The reactants/products of photosynthesis are used as the reactants for respiration. The products of respiration are used as the reactants for photosynthesis.

Which one stores energy? photosynthesis

Which one releases energy? cellular respiration



7. Compare and contrast the chloroplast and mitochondrion.

	Chloroplast	Mitochondria
Function?	capture E from sunlight	make ATP
What Process Occurs Here?	photosynthesis	cellular respiration Kreb + ETC
Cell Type Found In?	plant cell	animal & plant

8. How much ATP is produced in each process of aerobic cellular respiration?

Processes of Cellular Respiration	ATP
Glycolysis	2
Krebs Cycle	2
Electron Transport	34

9. Compare and contrast aerobic and anaerobic respiration (fermentation).

	Aerobic Respiration	Anaerobic Respiration
How Much ATP is Produced?	38	2
Presence of Oxygen?	yes	no

Which one produces more ATP? aerobic respiration

Cell Energy Practice Questions:

10. Which statement **best** explains why cellular respiration in plants and other organisms is dependent on photosynthesis?

- a. Photosynthesis is one of the final steps in cellular respiration.
- ☒ b. Photosynthesis provides the materials that fuel cellular respiration.
- c. Photosynthesis absorbs excess energy produced by cellular respiration.
- d. Photosynthesis absorbs materials that are catalyzed during cellular respiration.

11. Using a microscope, a student observes a small green organelle in a plant cell. Which energy transformation most likely occurs within the observed organelle?

- a. ATP to light
- ☒ b. Light to chemical
- c. Heat to electrical
- d. Chemical to chemical

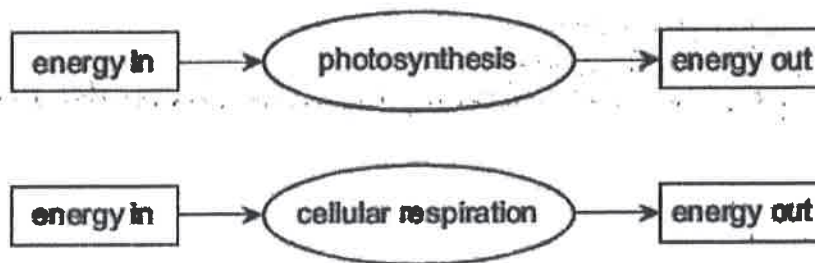
12. A cell in the leaf of a green plant performs both photosynthesis and cellular respiration, often at the same time. Which statement **best** describes how these processes are related to each other?

- a. Both processes produce carbon dioxide.
- b. Both processes require energy directly from the Sun.
- ☒ c. Products of one process are used as some of the reactants for the other process.
- d. Thermal energy from one process is used as the energy source for the other process.

13. A scientist observed that during the course of a chemical reaction the number of ATP molecules was reduced. What did the scientist **most likely** learn from the observation?

- a. The reaction produced water.
- b. The reaction consumed water.
- c. The reaction caused an output of energy.
- ☒ d. The reaction required an input of energy

Use the diagrams below to answer the question.



Part A: Complete the chart below by describing energy transformations involved in each process.

Process	Energy Transformations
Photosynthesis	$\text{CO}_2 + \text{H}_2\text{O}$ are transformed using sunlight to create $\text{C}_6\text{H}_{12}\text{O}_6$ and $\text{O}_2$
Cellular Respiration	$\text{O}_2$ & $\text{C}_6\text{H}_{12}\text{O}_6$ are broken down to form $\text{CO}_2 + \text{H}_2\text{O}$ , releasing large amount of ATP

Part B: Describe how energy transformations involved in photosynthesis are related to energy transformations involved in cellular respiration.

the reverse of one another

## Genetics:

- Describe what is taking place during each of the parts of Interphase:
  - G1: cell growth
  - S: DNA replication
  - G2: preparing for mitosis, organelles/molecules produced
- List the correct order of phases in mitosis and state what significant events occur during each phase.
  - Prophase
  - Metaphase
  - Anaphase
  - Telophase

- Complete the following table comparing mitosis and meiosis:

Process	# of divisions	# of cells formed	Type of cells formed (haploid/diploid)	Type of cells formed (somatic/gamete)	When/why does the process occur
Mitosis	1	2	diploid	Somatic	cell growth & repair
Meiosis	2	4	haploid	gamete	to form cells for reproduction

- What is an advantage to these three things: sexual reproduction, crossing over, meiosis

genetic variation

- What is the difference between homologous chromosomes and sister chromatids?

homologous - one from mom, one from dad      sister - original & replicated

- What is the difference between diploid and haploid cells?

diploid - 2 of each      haploid - only 1

- Are gametes diploid or haploid (circle one)?
  - Are somatic cells diploid or haploid (circle one)?
- If a skin cell of an animal had 52 chromosomes, how many chromosomes would be in an egg cell from this species? 26

- Explain the difference between Meiosis I and Meiosis II with respect to the alignment of the homologous chromosomes and sister chromatids? Explain tetrads.

meiosis I - homologous pairs separate

meiosis II - sister chromatids separate      all 4 together - tetrad

- What is a karyotype? photomicrograph of person's chromosomes

How can you tell a female from a male? XX - female      XY - male

- What is nondisjunction? error in meiosis, homologous chromosomes fail to separate

- What is another name for Down Syndrome? Trisomy 21

- Describe what the karyotype would look like in Down Syndrome. 3 of # 21

- What is the relationship between DNA and the proteins in your body?

DNA → RNA → proteins



13. Compare and contrast DNA and RNA.

	DNA	RNA
Sugars	deoxyribose	ribose
Strands	2	1
Nitrogen Bases	C G A T	C G A U
Location in the cell	nucleus	cytoplasm

14. A DNA molecule has a sequence of TAGCAG. What is the sequence of its complementary DNA strand? ATCGTC

15. A DNA molecule has a sequence of TTCAGT.

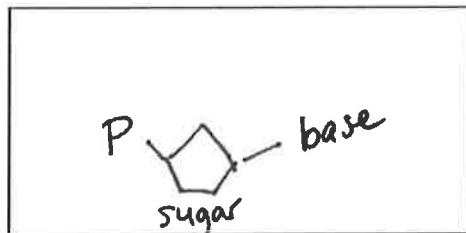
a. What is the sequence of an mRNA strand?

AAGUCA

b. What amino acids would be called for?

lys ser

16. Draw a nucleotide and label it:



17. How many nitrogen bases are included in one codon?

3

What does an mRNA codon code for?

amino acid

	U	C	A	G	
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	STOP	STOP	A
	Leu	Ser	STOP	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

18. Arrange the following terms in the correct order for protein synthesis:

RNA	DNA	Trait	Protein
2	1	4	3

Correct order: DNA → RNA → protein → trait

19. Where does transcription take place in the cell? nucleus Where does translation take place in the cell? cytoplasm or ribosome

20. What is the product of transcription? mRNA What is the product of translation? protein

21. Define the following terms:

- Homozygous (purebred): 2 identical alleles for particular trait (HH, hh)
- Heterozygous (hybrid): 2 different alleles for same trait (Hh)
- Genotype: combination of alleles inherited from parents
- Phenotype: physical appearance of a genotype
- Dominant: produces dominant phenotype when there is at least 1 copy of allele
- Recessive: only shown if there are 2 recessive alleles present (hides in presence of dominant allele)
- Gene: factors that determine traits (sections of DNA)
- Karyotype: photo of a person's chromosomes
- Pedigree: family tree showing members that are affected by a genetic trait

22. In humans, unattached earlobes are dominant (E) to attached earlobes (e). Summarize the **genotypic** and **phenotypic** ratios for each of the following crosses:

E e  
E EE Ee  
e Ee ee

a. EE X EE

all EE  
100%

100% unattached

b. ee X ee

all ee  
100%

100% attached

c. Ee X Ee

EE Ee ee 1:2:1

75% unattached, 25% attached

23. Define the following patterns of inheritance: Dominant allele is completely dominant over recessive

- a. Complete dominance → both alleles contribute to phenotype, "co-captains"  
b. Incomplete dominance → one allele is not completely dominant (blend)  
c. Codominance → both alleles contribute to phenotype, "co-captains"  
d. Polygenic → controlled by more than 1 gene  
e. Multiple alleles → more than 2, like Blood type

24. Complete the following genetics crosses:

- a. Determine the parents' genotypes and construct a Punnett Square for the following problem. Brown hair is dominant to blonde. Two parents are mated one with blonde hair and one with brown, and some of their children have blonde hair and some have brown.

B b  
b Bb bb  
b Bb bb

- b. A colorblind male with a female carrier. (Hint: colorblindness is x linked recessive)

X<sup>c</sup> X  
X<sup>c</sup> X<sup>c</sup>X<sup>c</sup> X<sup>c</sup>X  
Y X<sup>c</sup>Y X<sup>c</sup>Y

- c. A Red snapdragon with a pink snapdragon. (Hint: RR = red, rr = white, Rr = pink is the heterozygote showing incomplete dominance.)

R r  
R RR Rr  
r RR Rr

25. Why are X-linked disorders more common in males than females? only 1 X  
males only have one X (XY)

26. What is a pedigree? family tree showing genetic disorders

27. Explain Down Syndrome using the word nondisjunction. Trisomy 21  
"not coming apart" replicated

in meiosis prophase I, the homologous pairs of Chrom #21 fail to separate properly

## Genetics Practice Questions

Use the diagram below to answer the question.

DNA → Y → mRNA → Z → protein

28. Which labels correctly complete the diagram?

- a. Y is replication, and Z is translation.
- b. Y is translation, and Z is replication.
- ☒ c. Y is transcription, and Z is translation.
- d. Y is translation, and Z is transcription.

29. At a point in the cell cycle, chromosomes have aligned near the middle of a cell. Which sequence of events will the cell need to complete to produce two identical daughter cells?

- ☒ a. anaphase telophase cytokinesis
- b. anaphase II telophase II cytokinesis II
- c. prophase metaphase anaphase
- d. metaphase II anaphase II telophase II

30. In order to study genetic mutations, scientists must study genetic material. Which statement describes the genetic material scientists are most likely studying?

- a. They study alleles that contain chromosomes, which are RNA.
- b. They study alleles that contain genes, which are chromosomes.
- c. They study chromosomes that contain DNA segments, which are RNA.
- ☒ d. They study chromosomes that contain genes, which are DNA segments.

31. In a flowering plant species, red flower color is dominant over white flower color. What is the genotype of any red-flowering plant resulting from this species?

- a. red and white alleles present on one chromosome
- b. red and white alleles present on two chromosomes
- c. a red allele present on both homologous chromosomes
- ☒ d. a red allele present on at least one of two homologous chromosome

32. A cattle farmer genetically crosses a cow (female) with a white coat with a bull (male) with a red coat. The resulting calf (offspring) is roan, which means there are red and white hairs intermixed in the coat of the calf. The genes for coat color in cattle are co-dominant.

Part A: Although a farm has cattle in all three colors, the farmer prefers roan cattle over white or red cattle. Use the Punnett square to show a cross that would produce ONLY roan offspring.

W - White  
R - Red

WR - Roan

	W	W
R	WR	WR
R	WR	WR

Part B: Explain how a roan calf results from one white and one red coated parent. In your explanation, use letters to represent genes. Be sure to indicate what colors the letters represent.

explain the Punnet square in words.

Part C: Predict the possible genotypes and phenotypes of the offspring produced from two roan cattle.

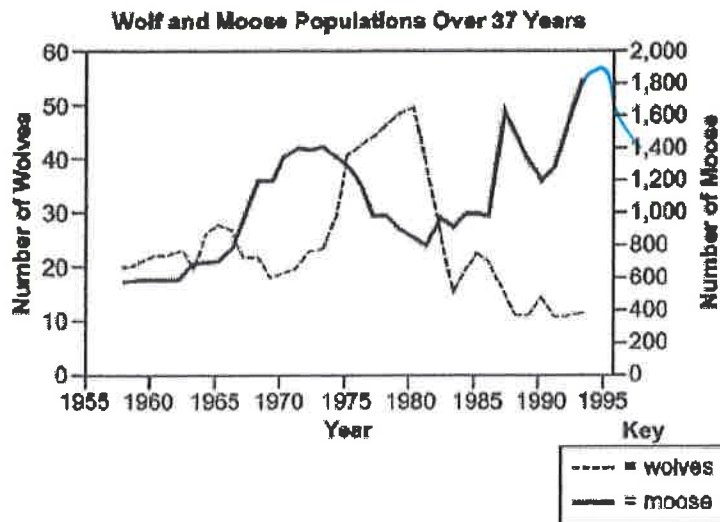
W R  
W WW WR  
R WR RR

## Ecology Practice Questions

Use the table below to answer question

Students' Observations of a Pond Ecosystem	
Quantitative	Qualitative
37 fish and 3 frogs	Leaves lie on the bottom of the pond.
2 types of aquatic grass	Water insects move along the water's surface.
12 small rocks and 1 medium rock	All 3 frogs are sitting on a pond bank.
sand	

1. A group of students measured a ten-square meter section of a pond ecosystem and recorded observations. Which statement is a testable hypothesis?
  - a. The frogs living in the pond represent a population.
  - b. Water is an abiotic component in the pond ecosystem.
  - c. If the fish are given more food, then they will be happier.
  - ☒ d. If the frogs are startled, then they will jump into the water.
2. A researcher observing an ecosystem describes the amount of sunlight, precipitation, and type of soil present. Which factors is the researcher MOST LIKELY describing?
  - a. Biotic factors in a forest.
  - b. Biotic factors in a tundra
  - ☒ c. Abiotic factors in a prairie
  - d. Abiotic factors in an ocean
3. Which description is the BEST example of a population?
  - ☒ a. All of the red foxes in a forest
  - b. All of the red foxes in every forest
  - c. All of the organisms in a forest
  - d. All of the organisms in every forest
4. In Pennsylvania, a nonnative plant called stiltgrass out-competes native plants in many forest ecosystems. Which BEST describes how the spread of stiltgrass negatively affects native herbivores?
  - a. Stiltgrass stops the life cycles of native herbivores.
  - ☒ b. Stiltgrass reduces the size of the native plant populations.
  - c. Stiltgrass increases the flow of energy through the ecosystem.
  - d. Stiltgrass attracts other nonnative plants to the forest ecosystem.



Isle Royale is located in Lake Superior. Isle Royale is home to populations of wolves and moose. The interactions between the wolves and moose, as well as the individual population sizes, have been studied since 1958. The graph shows the population sizes over time for both wolves and moose.

Part A: Describe one limiting factor for the moose population.

amount of food

Part B: Explain one likely reason why the wolf population rapidly increased between 1975 and 1980.

increase in moose population

Part C: Predict what will happen to the moose population's size after 1994 by describing the shape of the curve. In your answer, be sure to explain the reasoning behind your prediction.

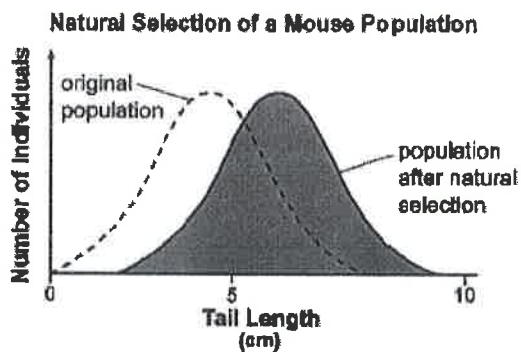
start to decrease as wolf population increases



## Evolution Practice Questions

5. A researcher observes two species of frogs in the same area. Both species have a similar diet. One species breeds in fast-moving streams, while the other species breeds in ponds. Both species are similar in appearance and have very similar DNA. Which information provides the BEST evidence that these two species descended from a common ancestor?
- The species' similar diets
  - The species' shared habitat
  - The species' mating behaviors
  - ☒ The species' physical characteristics

Use the graph below to answer the question



6. Tail length in mice varies within a population. Scientists observed change in the distribution of tail lengths in a mouse population over time. At the genetic level, what has MOST LIKELY happened to the allele for the shortest tail lengths?
- The allele changed from being dominant to being recessive.
  - The allele changed from being autosomal to being sex-linked.
  - ☒ The allele became less frequent than the alleles for longer tail lengths.
  - The allele began to code for long tail lengths instead of the shortest ones.

7. Overuse of antibiotics has caused antibiotic resistance in some bacteria in a population. Which statement describes the MOST LIKELY impact of natural selection on the bacterial population?
- Beneficial mutations have decreased, resulting in a larger population than normal.
  - Only the genes for antibiotic resistance are now expressed eliminating other genes.
  - ☒ More antibiotic-resistant bacteria have survived, resulting in more offspring with this trait.
  - The bacteria have become genetically isolated, resulting in decreased reproductive.
8. Which statement BEST describes how geographic isolation can contribute to land animal speciation?
- Geographic isolation physically separates populations but allows them to interact.
  - ☒ Geographic isolation physically separates populations and prevents them from interacting.
  - Geographic isolation causes genetic changes in individual organisms but allows them to interact.
  - Geographic isolation causes genetic changes in individual organisms and prevents them from interacting.



## Microbiology

1. Complete the table to compare and contrast bacteria and viruses.

Bacteria – Unique Features	Traits Common to Both	Viruses – Unique Features
living unicellular prokaryote	Can both be pathogenic both reproduce	non-living require host nucleic acid & protein coat (capsid)

2. What are the three different shapes of bacteria, using the scientific term for each?

- coccus
- bacillus
- spirillum

3. How do bacteria reproduce? Describe this process. asexual reproduction

4. What is the difference between facultative anaerobes and obligate aerobes?

- Facultative anaerobes: can live in aerobic or anaerobic environment
- Obligate anaerobes: only live in anaerobic environment

5. How do some bacteria help humans? List three clearly different ways.

- Digestive System
- Food Industry
- Sewage & waste water treatment

6. What are antibiotics? What are they used to treat? substances that kill bacteria

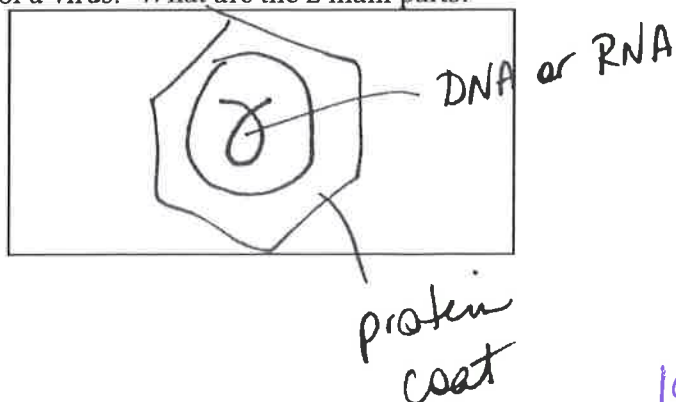
7. Why are antibiotics ineffective against viruses? they target bacteria, not viruses

8. What is antibiotic resistance? How/why does it occur? the ability to live & grow in the presence of antibiotics.  
The misuse & overuse of antibiotics

9. Why do you have to get some vaccines every year instead of only once?

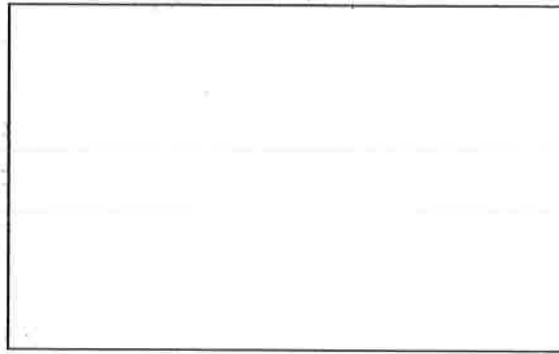
Some viruses are good at mutating, so each year they are a little different, rendering the old vaccine useless

10. Draw the basic structure of a virus. What are the 2 main parts?



11. Compare the lytic and lysogenic cycles of viral infection. Do a sketch of each that represents the differences.

lytic - infects cell,  
reproduces,  
causes cell to  
lyse (burst) &  
spread the  
virus



lysogenic -  
infects cell, inserts  
its DNA into the  
host DNA  
host cells divide &  
copy the DNA, may

12. What is a retrovirus? RNA virus, makes a DNA copy from its  
RNA when it infects a cell HIV

lay  
dormant  
until  
environmental  
conditions  
wake it up  
& it goes  
into the  
lytic cycle

## Embryology

- What is the difference between sexual and asexual reproduction? male & female, genetic variation
  - Which process requires meiosis (circle one)? sexual reproduction or asexual reproduction
  - What is a benefit of this type of reproduction? genetic variation

2. Place the following words in chronological order & then define them:

- |                             |                            |                            |                     |
|-----------------------------|----------------------------|----------------------------|---------------------|
| a. <del>Fertilization</del> | d. <del>Zygote</del>       | g. <del>Cleavage</del>     | j. <del>Fetus</del> |
| b. <del>Blastula</del>      | e. <del>Implantation</del> | h. <del>Gastrulation</del> |                     |
| c. <del>Gastrula</del>      | f. <del>Morula</del>       | i. <del>Embryo</del>       |                     |

- Fertilization - union of sperm & egg to form zygote
- Zygote - union of sperm & egg
- Embryo - zygote up until 8 weeks
- Cleavage - rapid cell division with no growth
- Morula - tight ball of about 64 cells
- Blastocyst / Blastula - hollowed ball of cells (inner-embryo, outer-trophoblast)
- Implantation - implanting of blastocyst in uterine wall
- Gastrulation - formation of germ layers
- Gastrula - the embryo once it has germ layers
- Fetus - 8 weeks til birth

- What are stem cells? potential to develop into new or specialized cells
- What is differentiation? unspecialized cell to a specialized cell  
stem cell → nerve cell
- What is the role of the placenta? embryo's organ of respiration, nourishment, & excretion
- Name the germ layers in spaces a - c?
  - Endoderm
  - Mesoderm
  - Ectoderm
- When do they arise? gastrulation
- What do they produce? all of the body systems
- What is the first system to develop in a growing embryo? nervous system

